DOCUMENT RESUME

ED 471 780 SE 067 039

AUTHOR	Murata, Aki; Takahashi, Akihiko
TITLE	Vehicle To Connect Theory, Research, and Practice: How Teacher Thinking Changes in District-Level Lesson Study in Japan.
PUB DATE	2002-00-00
NOTE	11p.; In: Proceedings of the Annual Meeting [of the] North American Chapter of the International Group for the Psychology of Mathematics Education (24th, Athens, GA, October 26-29, 2002). Volumes 1-4; see SE 066 887.
AVAILABLE FROM	ERIC/CSMEE Publications, 1929 Kenny Road, Columbus, OH 43210-1080. Tel: 800-276-0462 (Toll Free).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Educational Change; *Educational Strategies; Elementary Secondary Education; Foreign Countries; *Mathematics Education; Professional Development
IDENTIFIERS	*Japan

ABSTRACT

Lesson study is the major form of professional development in Japan and has attracted attention in the United States in recent years. Lesson study currently conducted in Japan varies in terms of length, structure, and scale. District-level mathematics lesson study gathers teachers from different schools who share an interest in teaching the subject, and the discussion can focus more on particular aspects of teaching mathematics or content issues than that of in-school lesson study. The results of the survey indicate that lesson study provides opportunities for better communication among teachers, researchers, and administrators by presenting concrete classroom teaching examples surrounding particular educational ideas and/or issues, thus minimizing the gap among theory, research, and practice. Implications to U.S. schools are discussed. (Author)

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

D. Owens

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

VEHICLE TO CONNECT THEORY, RESEARCH, AND PRACTICE: HOW TEACHER THINKING CHANGES IN DISTRICT-LEVEL LESSON STUDY IN JAPAN

Aki Murata
Northwestern University
amurata@northwestern.edu

Akihiko Takahashi
University of Illinois Urbana-Champaign
takahash@uiuc.edu

Lesson study is the major form of professional development in Japan and has attracted attention in the United States in recent years. Lesson study currently conducted in Japan varies in terms of length, structure, and scale. District-level mathematics lesson study gathers teachers from different schools who share an interest in teaching the subject, and the discussion can focus more on particular aspects of teaching mathematics or content issues than that of in-school lesson study. The results of the survey indicate that lesson study provides opportunities for better communication among teachers, researchers, and administrators by presenting concrete classroom teaching examples surrounding particular educational ideas and/or issues, thus minimize the gap among theory, research, and practice. Implications to U.S. schools are discussed.

Purposes

In this paper, we begin with describing what lesson study is and how various forms of lesson study differ from one another in their structures. We then report from our survey study how lesson study works to connect theory, research, and teaching practice in schools and how it can affect teacher thinking and learning to improve mathematics education in Japan. Lesson study is the major form of professional development in Japan, and some U.S. teachers have recently initiated it in their own schools (Germain-McCarthy, 2001; Research for Better Schools, 2000; Stepanek, 2001; Weeks, 2001). With the prospect of lesson study being incorporated in U.S. settings, it is important that U.S. practitioners be informed of the ways in which various forms of lesson study influence teacher thinking and practices in Japan so that we can better explore its potential impact on U.S. teachers. The idea of lesson study was introduced only around a small-scale and school-based study so far in the United States, and the effectiveness of lesson study has been discussed from data primarily based on observations. To date, no research has described how various forms of lesson study are organized and conducted in Japan, or what the experience means to Japanese teachers. It is our attempt to increase the international communication by reporting these aspects of lesson study, and thus, contribute to the collaborative effort to define a new model of lesson study in the United States.

Perspectives

What Is Lesson Study?

Lesson study is a form of professional development commonly and widely conducted in Japan (Fernandez, Chokshi, Cannon, & Yoshida, 2001; Lewis, 2000;

ED 471 780

SE067039

BEST COPY AVAILABLE

Lewis & Tsuchida, 1998; Shimahara, 1999; Stigler & Hiebert, 1999; Yoshida, 1999). In lesson study, teachers work collaboratively to: 1) formulate long-term goals for student learning and development, 2) plan, conduct, and observe a 'research lesson' designed to bring these long-term goals to life as well as to teach a particular academic content, 3) carefully observe student learning, engagement, and behavior during the lesson, and 4) discuss and revise the lesson and the approach to instruction based on these observations. The research lesson is taught in a regular classroom with students, and participants observe as the lesson unfolds in the actual teaching-learning context. Debriefing following the lesson is developed around the student learning data collected during the observation. Through the process, teachers are given opportunities to reflect on their teaching and student learning.

Lesson study embodies many features that researchers have noted effective in changing teacher practice, such as using concrete practical materials to focus on meaningful problems, taking explicit account of the contexts of teaching and the experiences of teachers, and providing on-site support within a collegial network. It also avoids many features noted as shortcomings of typical professional development; e.g., that is short-term, fragmented, and externally administered (Cuban, 1990; Firestone, 1996; Huberman & Gusky, 1994; Kennedy, 1999; Little, 1993; Miller & Lord, 1994; Pennel & Firestone, 1996). Furthermore, researchers have argued that lesson study is the critical system feature that has enabled Japanese elementary teachers to improve classroom instruction in mathematics and science in recent decades (Linn, Lewis, Tsuchida, & Songer, 2000; Lewis & Tsuchida, 1998; Takahashi, 2000; Stigler & Hiebert, 1999; Yoshida, 1999).

Lesson study has become visible in state, national, and international conferences, open houses, high-profile policy reports, and special journal issues in recent years in the United States. Moreover, some school districts in the United States have attempted to use it to change their practice and impact student learning (Coeyman, 2000; Council for Basic Education, 2000; Germain-McCarthy, 2001; Research for Better Schools, 2000; Stepanek, 2001; Weeks, 2001).

Different Types of Lesson Study

The type of lesson study known and tried in the United States so far is small-scaled in-school lesson study. However, lesson study that is currently conducted in Japan varies in terms of length, structure, and scale. Besides the type of lesson study that is conducted within a single school, school districts organize lesson study for groups of teachers who share similar professional interests (e.g., subject matter) or who are at the same professional stage. Thus, district-level lesson study tends to focus on particular issues and topics to connect teachers from different schools. At other times, national-level research organizations conduct lesson study that gathers hundreds of teachers nation-wide.

At district- and national-level lesson study focused on mathematics, the teachers who participate are particularly interested in mathematics. They bring their knowledge of and experience with teaching mathematics to the study, and the level of the discussion is likely to be higher than that of the in-school lesson study. The main purpose of in-school lesson study can be to present opportunities for teachers whose main interest may or may not be mathematics to think about their teaching of the subject in general. At a district-level lesson study, the discussion can focus more on particular aspects of teaching mathematics or content issues. When it comes to national-level lesson study, the level of discussion may become very high. However, because of the large number of participants, they often cannot fit in a single classroom, and the research lesson presented may be considered unrealistic. For that reason, district-level lesson study maintains its unique middle-of-the-range characteristics.

Lesson study also plays an important role in improving curricula, textbooks, and teaching and learning materials in Japan. Most Japanese mathematics textbook publishers employ authors who are also classroom teachers involved in lesson study, and their materials are in some manner examined through the process of lesson study. The same situations can be found in the process of developing teaching and learning materials such as manipulatives and teachers' reference manuals. Japanese textbook publishers often include teachers' ideas and lesson plans that have been examined and discussed at district-level lesson study in particular because they are most likely to exhibit high mathematics content in a realistic manner.

District-level lesson study is often conducted to explore a new educational idea or a goal that is currently being explored, and a number of teachers across different schools come to participate for this type of lesson study. Each time the Course of Study was revised in Japan during the last few decades, lesson study across the country was conducted that particularly focused on exploring and demonstrating the new educational issues. Teachers collaboratively worked to illustrate how new ideas may be used in classrooms through their teaching, make the ambiguous aspects of the ideas come to surface, and set a stage for discussion for better understanding of the ideas in the future. The mechanisms of this type of lesson study will be discussed later.

Methods

Survey questionnaires (Attachment) were sent to selected Japanese elementary school teachers who had played main roles in organizing district-level mathematics lesson study and are considered to be the leaders in the field. They lived in metropolitan Tokyo and its surrounding area and had thorough knowledge of how lesson study is conducted at the district-level. The total of 125 responses were collected.

For the 125 teachers, the median number of years they had taught was 16. They had participated in mathematics lesson study an average of 5 times a year, and taught research lessons in district-level lesson study an average of 10 times. They also reported that they thought approximately 35% of all Japanese teachers had taught a

mathematics research lesson at least once in their professional career, thus the average of 10 lessons taught indicated that the teachers who responded to the survey questionnaires were especially experienced in lesson study.

The questionnaires were designed to draw out information from the teachers regarding their experiences with district-level lesson study. They were specifically asked the (1) frequency and duration of district-level lesson study, (2) cooperative mechanisms between schools and districts in organizing a lesson study, (3) advantages district-level lesson study provides for teachers, and (4) problems or factors that should be improved for successful district-level lesson study. Multiple-choice/fill-the-blank questions were used to draw an overall picture, and open-ended questions then followed to gather details in teachers' own words.

After all the survey forms were collected, data were organized and compiled in a matrix to visualize the possible common categories. The data from multiple-choice questions were examined to draw a concrete image of the ways in which district-level lesson study is conducted in Japan. The data from open-ended questions were reviewed multiple times by two researchers to identify underlying threads that connected the responses from different teachers and different questions. The responses were then coded to indicate the teachers' beliefs, knowledge, and practice.

Results and Discussion

How Is District-Level Lesson Study Organized and Conducted?

Teachers responded that 98% of all school districts conduct mathematics lesson study regularly as a part of district-level professional development sessions. For the questions that asked the teachers to identify other activities likely to be included in those professional development sessions, 71% reported lectures by university professors and other authorities, 65% reported sessions for teachers to share each other's research, 40% reported model lessons taught by a known practitioner, and 28% reported workshops. The majority of the teachers (66%) reported that the professional development sessions in those districts were held approximately once or twice every trimester (Japanese school trimester range between 3 and 4 months).

Approximately half of the teachers (48%) responded that district-level professional development sessions are typically held in the afternoon of a regular school day. On those professional development days, schools in the district maintain the regular school day except for the school to be used for the lesson study. After all the students go home, teachers gather at the school where students remain for the extra class period for the research lesson. In other cases, the whole district cancels one school day and devotes it to professional development day (37%). Only the children in the classroom used for the research lesson attend schools for the lesson period.

In most cases, school districts or schools financially support district-level lesson study. Eighty-six percent (86%) of the teachers reported that districts cover the entire expenses (e.g., transportation), and 13% of the teachers reported they do so partially.

For lesson planning and teaching, 64% of the teachers reported that classroom teachers typically lead the district-level lesson study. It is a collaborative process, and 94% of the teachers said lessons are planned by a group of teachers together. They typically prepare lesson plans outside of their instructional time (84%), while on some occasions, schools make extra planning time within the regular school hours (4%) or the teachers do so on their own (6%). When a group of teachers work together to write a lesson plan and prepare for a lesson study, the teachers reported that they meet approximately 3 to 4 times (76%), more than 5 times (14%), or 1 to 2 times (10%) before the actual lesson study day.

Teacher Changes

The teachers felt strongly that lesson study helped them improve their teaching. Almost all (98%) the teachers either agreed or strongly agreed that they had grown professionally by participating in lesson study and observing research lesson. Over ninety percent (91%) of the teachers also agreed or strongly agreed that lesson study is the most effective form of professional development. In comparing different forms of lesson study by ranking, 31% of the teachers reported that lesson study organized by an educational organization is the most effective, followed by district-level lesson study (26%), and lesson study held within a school (21%).

Many teachers described how seeing research lessons completely changed their beliefs about teaching. They described the experiences in their own words (translated from Japanese) as follows:

> When I was young, I used to have the attitude that teachers needed to teach everything, but through lesson study, I came to think that teachers are the learning "assistants" for students and it is important to carefully prepare lessons so that students can investigate and solve problems on their own. (Number of years taught 9, average number of times participated in lesson study per year, 3)

> I used to think the lessons that are aligned closely to textbooks are the best ones for students. After seeing research lessons where teachers tried to make a textbook lesson closer to students, I started to think about and search for good teaching material for my students as I plan mathematics lessons. (Number of years taught 12, average number of times participated in lesson study per year 2)

> When I was young, I thought teaching was to make a point and explain students so that they can understand better. So, to me, back then, it was critical to find the 'technique' to do that effectively. After seeing the investigative open-ended lesson, I have come to think that learning is not what I had thought. (Number of years taught 17, average number of times participated in lesson study per year, 6)

Another teacher noted about his experiences as follows:

> I don't see my teaching as a complete "instructional method" any longer. I now see the methods that may possibly become a part of good instruction. (Number of years taught 13, average number of times participated in lesson study per year 12)

Lesson study helps Japanese teachers experience good teaching practice when the ideas may not appeal to them theoretically. Seeing the successful examples helps teachers understand the benefit of the different and/or unfamiliar practices, and they come to see the good lesson in terms of children's learning across different theories and approaches.

Connecting Theory and Practice

The teachers indicated that they saw lesson study as an important and effective link between educational theories and their classroom practice. Many teachers responded that seeing new ideas demonstrated in research lessons and participating in discussion of the actual practice strengthened their understanding of such ideas. They described the experiences as follows:

> (To US teachers,) I think it is important to actually teach lessons and get feedback from others, and not just reading theories in books or attending lectures. (Number of years taught 1, average number of times participated in lesson study per year 1)

> It is hard to incorporate new instructional ideas and materials in classrooms unless we see how they actually look. In lesson study, we see what goes on in the lesson more objectively, and that helps us understand the important ideas without being overly concerned about other issues in own classrooms. (Number of years taught 22, average number of times participated in lesson study per year 20)

On more practical side, many teachers reported that seeing actual materials used in the research lesson classroom helped them understand the benefit of the materials in the particular lesson to help children's learning.

> For teaching the unit on large numbers for second grade, I saw how one-yen coins (pennies) were used effectively, and the small trays that accompanied the activity. (Number of years taught 1, average number of times participated in lesson study per year 1)

> When I see an effective use of manipulatives, a bulletin board, or a good way the teacher presents an investigative situation using questions, I take the idea to my classroom and use it. (Number of years taught 10, average number of times participated in lesson study per year 5)

I learned what to prepare for the open-ended investigative problem solving (hint card, etc.). (Number of years taught 11, average number of times participated in lesson study per year 4)

Lesson study provides live examples for teachers to see and experience how educational ideas are played out in actual classrooms. Seeing the actual practice makes it easier for the teachers to think and adapt the ideas. Even for novice teachers, they reported that participating in discussions with more experienced peers using concrete classroom data helped them understand the importance of the new ideas and apply them practically. Lesson study plays a critical role in connecting theory and practice in Japanese education, and may potentially do the same for U.S. schools.

Implication and Conclusion

With the absence of national curriculum and shared vision, U.S. teachers are sometimes left alone to make everyday teaching decisions in their own classrooms. When the larger culture values autonomy and independence, it makes it even harder for them to communicate with one another. This not only makes their work more difficult but also keeps them from learning from one another to improve the learning chances of their students. Well-crafted educational theories may be understood partially and taken by pieces by different teachers and lose their original shape when communication is limited. The Japanese teachers who responded to the survey indicated that this is not a unique situation in the United States, however, and Japanese teachers also struggle to make sense of new ideas and help them come to life in their classrooms. Lesson study provides opportunities for better communication among teachers, researchers, and administrators in Japan by presenting concrete classroom teaching examples surrounding particular educational ideas and/or issues. Discussions focused on the particular classroom examples or data helps people to communicate better and understand one another. Lesson study will potentially help create a place and a reason for all people who work to improve education of our children to gather and discuss their ideas within the actual U.S. classrooms. The commonly seen disconnect between theory, research, and practice may be minimized just by having such a common place for all.

As we continue our collaborative effort to define U.S. lesson study model, future studies should explore the effect of lesson study on teachers and students by going beyond their self-reports and observations. The studies are needed that address the particular aspects of teacher learning and teacher change as a result of their participation in lesson study, and the influence of such changes on students learning in the classroom. Focused case study of a particular teacher, video-tape analysis of the changes in teaching practice, and/or careful examination of students' understanding of mathematics before and after the teacher participates in lesson study may provide us different pictures of its potential effectiveness in U.S. mathematics classrooms.

References

Coeyman, M. (2000, May 23). US school, Japanese methods. *Christian Science Monitor* (p. 1).

Council for Basic Education. (2000). The eye of the storm: Improving teaching practices to achieve higher standards. Briefing book, Wingspread Conference September 24-27, Racine, WI.

Cuban, L. (1990). Reforming again, again, and again. *Educational Researcher*, 19(1), 3-13.

Fernandez, C., Chokshi, S., Cannon, J., & Yoshida, M. (2001). Learning about lesson study in the United States. In E. Beauchamp (Ed.). *New and old voices on Japanese education*. New York: Sharpe.

Firestone, W. A. (1996). Images of teaching and proposals for reform: A comparison of ideas from cognitive and organizational research. *Educational Administration Quarterly*, 32, 209-235.

Germain-McCarthy, Y. (2001). *Bringing the NCTM standards to life: Exemplary practices for middle schools*. Larchmont, NY: Eye on Education.

Huberman, M., & Guskey, T. R. The diversities of professional development. In T. R. Guskey & M. Huberman (Eds.). *Professional development in education: New paradigms and practices* (pp. 46-68). New York: Teachers College Press.

Lewis, C., & Tsuchida, I. (1998). A lesson is like a swiftly flowing river: How research lessons improve Japanese education. *American Educator*, 22(4), 12-17, 50-52.

Lewis, C. (2000, April). *Lesson study: The core of Japanese professional development*. Paper presented at American Educational Research Association annual meeting, New Orleans.

Little, J. W. (1993). Teachers' professional development in a climate of educational reform. *Educational Evaluation and Policy Analysis, 15*, 129–151.

Linn, M., Lewis, C., Tsuchida, I., & Songer, N. (2000). Beyond fourth-grade science: Why do U.S. and Japanese students diverge? *Educational Researcher*, 29(3), 4-14.

Miller, B., & Lord, B. (1994). *Staff development for teachers: A study of configurations and costs in four districts*. Newton, MA: Education Development Center.

Pennell, J. R., & Firestone, W. A. (1996). Changing classroom practices through teacher networks: Matching program features with teacher characteristics and circumstances. *Teachers College Record*, 98(1), 46-76.

Research for Better Schools. (2000). Against the odds, America's lesson study laboratory emerges. *Currents Newsletter, 4.1*. Available: http://www.rbs.org

Shimahara, N. K. (1999). Japanese initiatives in teacher development. Kyoiku Daigaku Gakkou Kyouiku Sentaa Kiyo, 14, 29-40.

Stepanek, J. (2001) A new view of professional development. *Northwest Teacher*,

2(2), 2-5.
Stigler, J. W., & Hiebert, J. (1999) The teaching gap: Best ideas from the world teachers for improving education in the classroom. New York: Free Press.
Takahashi, A., (2000), Current trends and issues in lesson study in Japan and the United States. *Journal of Japan Society of Mathematical Education*, *82*(12: 49-6), 15-21 (in Japanese).
Weeks, D. J. (2001). Creating happy memories. *Northwest Teacher* 2(2), 6-11.
Yoshida, M. (1999). Lesson study: A case study of a Japanese approach to improving instruction through school-based teacher development. Doctoral dissertation, University of Chicago.

Attachment on Following Page

Questions about mathematics lesson study

1. At your district, is mathematics lesson study conducted regularly? Yes / No
2. For the following questions, please take your overall experience with lesson study in consideration (not only of your current school district)
   (a) In general, how often do you think district-level mathematics professional development sessions are held? Once a month / Once or twice a trimester / Once or twice a year / Other
   (b) In general, how often do you think lesson study is conducted as a part of the district-level mathematics professional development? Once a month / Once or twice a trimester / Once or twice a year / Other
   (c) What other activities do you think are part of the district-level mathematics study session? (Please choose as many as you wish) A lecture by a university professor / A model lesson taught by a known practitioner / A session for teachers to share each other's research / Workshops / Other
   (d) How do you think teachers make time to attend district-level mathematics lesson study? The whole district cancels a school day and keeps only the children in the classroom used for the lesson study / The whole district uses the after-school hours and keeps only the children in the classroom that is to be used for the lesson study / The whole district conducts lesson study during the regular school time and teachers assign independent work for students during their absence / Other
   (e) Who is financially responsible for teachers' expenses to attend district-level mathematics lesson study? (e.g., transportation) School district or school covers the whole expense / School district or school covers the partial expenses / Participating teachers pay on their own / Other
   (f) In general, who leads the district-level mathematics lesson study? School district or instructional department of the district / School administrators / Classroom teacher who belongs to the research committee / University professor or researcher (external) / Other
   (g) In general, who makes the lesson plan for a district-level mathematics lesson study? School district or instructional department of the district / University professor or researcher (external) / The teacher who teaches the lesson / A group of teachers including the teacher who teaches the lesson / A group of teachers not including the teacher who teaches the lesson / Other
   (h) How do teachers make time to prepare for the district-level mathematics lesson study? (e.g., writing a lesson plan) For the teacher who teaches the lesson or the others who help the lesson planning, schools make extra planning time for them within the regular school hours / The teachers make time within their instructional time on their own / The teachers plan outside of their instructional time / Other

BEST COPY AVAILABLE

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

X	This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.
	This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").